

Stuart R. Borrett

Associate Provost for Research & Innovation

Professor, Dept. of Biology and Marine Biology, University of North Carolina Wilmington, Wilmington, NC 28403

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RESEARCH INTERESTS

- Systems ecology
- Ecological modeling, simulation, & analysis
- Network science
- Coastal and marine science
- Indirect effects
- Data science
- Coupled human-natural systems
- Environmental impact assessment

EDUCATION

2005 **Doctor of Philosophy**, Ecology, University of Georgia, Athens, GA

Dissertation: *Ecosystem organization and transformation: The role of network architecture in the development of indirect effects*. Advisor: Dr. Bernard C. Patten

1997 **Bachelor of Arts**, Biology, Austin College, Sherman, TX

Biology Department, Center for Environmental Studies

EXPERIENCE: ACADEMIC AND INDUSTRY

Associate Provost of Research & Innovation. July 2019–present. University of North Carolina Wilmington (UNCW), Wilmington, NC.

President. July 2018–present. UNCW Research Foundation, Wilmington, NC.

Professor (Quantitative Ecologist). August 2018–Present. Department of Biology and Marine Biology, UNCW.

Visiting Research Fellow. 2013–present. Duke Network Analysis Center, Social Science Research Institute, Duke University, Durham, NC.

Interim Associate Provost of Research. July 2018–June 2019. UNCW, Wilmington, NC.

Associate Professor (Quantitative Ecologist). July 2013–Aug. 2018. Department of Biology and Marine Biology, UNCW.

Assistant Professor (Quantitative Ecologist). 2007–2013. Department of Biology and Marine Biology, UNCW. Full time tenure-track position.

Adjunct Assistant Professor. 2008–2012. Biology Department, Western Kentucky University. Research mentor for students in collaboration with Dr. Albert Meier.

Postdoctoral Research Scientist. 2005–2007. Computational Learning Laboratory, Center for the Study of Language and Information, Stanford University, Stanford, CA. *Computational Induction of Scientific Process Models*. Advisors: P. Langley and K.R. Arrigo.

Research Assistant. 2003–2005. Skidaway Institute of Oceanography. *Bio-feed back basis of self-organization in planktonic ecosystems using *Phaeocystis* as a model complex adaptive system*. PIs: P.G. Verity, M.E. Frischer, M.E. Hay, B.C. Patten. Skidaway, GA.

Research Assistant. 2002. Institute of Ecology, University of Georgia. *Effects of water withdrawal on inter-annual variability of stream low-flow characteristics*. PI: M. Freeman. Athens, GA.

Research Assistant. 1999–2002. Institute of Ecology, University of Georgia. *Community values and the long-term ecological integrity of rapidly urbanizing watersheds*. PIs: M.B. Beck, B.G. Norton, B.C. Patten, K.G. Porter, T.C. Rasmussen, A. Steinmann. Athens, GA.

Assistant Staff Scientist. 1997–1998. ENTRIX, Inc. Houston, TX. Environmental impact assessment and environmental management planning, primarily for oil and gas exploration and development in the US Gulf Coast and Latin America (Bolivia, Ecuador, Venezuela).

Research Assistant. 1995–1997. Austin College. *Dual interpretation of low intensity light by Japanese Quail* and *The effect of continuous release melatonin on reproduction in Japanese Quail*. PI: W. Meyer. Sherman, TX.

HONORS & AWARDS

- 2009–present Recognized by one or more graduating senior at UNCW as a person whose impact on them was significant. Annually 2009–2020.
- 2015 College of Arts and Science Research Reassignment (competitive ~1.5%), UNCW (1 semester without teaching to focus on research, Spring 2016)
- 2011 Dept. Research Reassignment (competitive), Dept. of Biology and Marine Biology, UNCW (1 semester without teaching to focus on research, completed Spring 2013)
- 2009 Chancellor’s *Discere Aude* Award for outstanding mentorship, UNCW.
- 1997 Austin College, *cum laude*
- 1997 βββ, Biology Honor Society
- 1997 Austin College, M.D. “Bud” Bryant Fellowship, Outstanding Biology Student
- 1993–1997 Austin College, Trustees Scholarship
- 1997 Austin College, Leadership Honor Society
- 1989 Eagle Scout, Troop 2, El Paso, TX

RESEARCH

Publications

* postdoc, ** graduate student, *** Undergraduate student

Link to [my profile](#) on Google Scholar

Peer Reviewed

In Print

2020

50. Biodiversity increases multitrophic energy use efficiency, flow and storage in grasslands. Buzhdygan, OY, Meyer, ST, Weisser, WW, Eisenhauer, N, Ebeling, A, Borrett SR, De Deyn, GB, Hines, J, Mommer, L, Petermann, JS. *Nature Ecology and Evolution*, <https://doi.org/10.1038/s41559-020-1123-8>

49. Shifting levels of ecological network's analysis reveals different system properties
Niquil, N., Haraldsson, M., Sime-Ngando, T., Huneman, P., Borrett, S.R.
Philosophical Transactions of the Royal Society B – Biological Sciences, 375:20190326.
<https://doi.org/10.1098/rstb.2019.0326>
- 2019
48. Walk partitions of flow in Ecological Network Analysis: Review and Synthesis of Methods and Indicators.
Borrett, S.R., Scharler, U. M.
Ecological Indicators 106:105451 [doi: 10.1016/j.ecolind.2019.105451](https://doi.org/10.1016/j.ecolind.2019.105451)
47. Beyond the Black Box: Promoting mathematical collaborations for elucidating interactions in soil ecology.
Bennett, Alison; Preedy, Katharine; Golubski, Antonio; Umbanhowar, James; Borrett, Stuart; Byrne, Loren; Apostol, Kent; Bever, James; Biederman, Lori; Classen, Aimee; Cuddington, Kim; de Graaff, Marie-Anne; Garrett, Karen; Gross, Lou; Hastings, Alan; Hrynkiw, Volodymyr; Karst, Justine; Kummel, Miroslav; Lee, Charlotte; Liang, Chao; Liao, Wei; Mack, Keenan; Miller, Laura; Ownley, Bonnie; Rojas, Claudia; Simms, Ellen; Walsh, Vonda; Warren, Matthew; Zhu, Jun
Ecosphere 10(7): e02799 [doi: 10.1002/ecs2.2799](https://doi.org/10.1002/ecs2.2799)
46. Combining scientific and fishers' knowledge to co-create indicators of food web structure and function.
Bentley, J.W., Hines, D.E., Borrett, S.R., Serpetti, N., Hernandez-Milin, G., Fox, C., Heymans, J.J., Reid, D.G.
ICES Journal of Marine Science, fsz121, <https://doi.org/10.1093/icesjms/fsz121>
45. Ecological Network Analysis Metrics: The need for an entire ecosystem approach in management and policy.
Fath, BD, Asmus, H, Asmus, R, Baird, D., Borrett, SR, de Jonge, VN, Ludovisi, A, Niquil, N, Scharler, UM, Schueckel, U, Wolff, M.
Ocean and Coastal Management 174: 1–14 <https://doi.org/10.1016/j.ocecoaman.2019.03.007>
44. Diet uncertainty analysis strengthens model-derived indicators of food web structure and function.
Bentley, J.W., Hines, D.E., Borrett, S.R., Serpetti, N., Fox, C., Reid, D.G., Heymans, J.J.
Ecological Indicators 98: 239-250 <https://doi.org/10.1016/j.ecolind.2018.11.008>
- 2018
43. Bibliometric review of Ecological Network Analysis: 2010-2016.
Borrett, S.R., Sheble, L., Moody, J., Anway**, E.
Ecological Modelling 382: 63–82. [doi: 10.1016/j.ecolmodel.2018.04.020](https://doi.org/10.1016/j.ecolmodel.2018.04.020)
42. Seasonal dynamics and ecosystem functioning of the Sylt-Rømø Bight, Northern Wadden Sea
de la Vega, C. Horne, S., Baird, D., Hines, D., Borrett, S.R. Jensen, L., Schwemmer, P, Asmus, R., Siebert, U., Asmus, H.
Estuarine, Coastal and Shelf Science 203: 100-118
41. Uncertainty analyses for Ecological Network Analysis enable stronger inferences
Hines**, D.E., Ray, S., and Borrett, S.R.
Environmental Modelling & Software 101: 117–127. [doi: 10.1016/j.envsoft.2017.12.011](https://doi.org/10.1016/j.envsoft.2017.12.011)
- 2017
40. Estimating the impact of oyster restoration scenarios on transient fish production
McCoy, E. Borrett, S.R., LaPeyre, M.K., Peterson, B.J.
Restoration Ecology 25(5): 798–809. [10.1111/rec.12498](https://doi.org/10.1111/rec.12498)

39. Ecological Network Metrics: Opportunities for Synthesis
Lau, M.K., Borrett, S.R., Baiser, B., Gotelli, N.J., Ellison, A.M.
EcoSphere 8(8) e01900 [10.1002/ecs2.1900](https://doi.org/10.1002/ecs2.1900) (BioRxiv preprint [10.1101/125781](https://doi.org/10.1101/125781))
38. Comparative study of food webs from two different time periods of Hooghly Matla estuarine system, India through network analysis
Rakshit, N, Banerjee, A, Mukherjee, J, Chakrabarty, M, Borrett, S.R., Ray, R.
Ecological Modelling. 356: 25–37. [10.1016/j.ecolmodel.2017.04.003](https://doi.org/10.1016/j.ecolmodel.2017.04.003)

2016

37. The roles of weighting and indirect effects in identifying keystone species
Zhao, L., Zhang, H., O’Gorman, E.J., Wang, T., Ma, A., Moore, J.C., Borrett, S.R., Woodward, G.
Ecology Letters 19(9): 1032–1040 [10.1111/ele.12638](https://doi.org/10.1111/ele.12638)
36. Genotypic variation in foundation species generates network structure that may drive community dynamics and evolution.
Lau, M.K., Keith, A., Borrett, S.R., Schuster, S., Whitham, T.
Ecology 97: 733–742. [dx.doi.org/10.1890/15-0600.1](https://doi.org/10.1890/15-0600.1)
35. Six general ecosystem properties are more intense in biogeochemical cycling networks than food webs.
Borrett, S.R., Hines**, D.E., Carter***, M.
Journal of Complex Networks 4:575-603 [doi: 10.1093/comnet/cnw001](https://doi.org/10.1093/comnet/cnw001).
34. Evaluating control of nutrient flow in an estuarine nitrogen cycle through comparative network analysis.
Hines**, D.E, Singh, P., Borrett, S.R.
Ecological Engineering 89: 70–79. DOI: [10.1016/j.ecoleng.2016.01.009](https://doi.org/10.1016/j.ecoleng.2016.01.009).

2015

33. Spatial heterogeneity in soil microbes alters establishment success of an introduced plant.
Abbott, K.C., J. Karst, L. Biederman, S.R. Borrett, A. Hastings, J.D. Bever, V. Walsh, L. Miller.
PLoS ONE 10(5): [e0125788](https://doi.org/10.1371/journal.pone.0125788). doi:10.1371/journal.pone.0125788.
32. Estimating the effects of seawater intrusion on an estuarine nitrogen cycle by comparative network analysis.
Hines, D.E.**, J.A. Lisa**, B. Song, C.R. Tobias, S.R. Borrett
Marine Ecology Progress Series 524: 137–154 Preprint: [arXiv:1311.1171](https://arxiv.org/abs/1311.1171) [q-bio.QM] [doi: 10.3354/meps11187](https://doi.org/10.3354/meps11187)

2014

31. enaR: An R package for Ecosystem Network Analysis
Borrett, S.R., M.K. Lau**
Methods in Ecology and Evolution 5: 1206-1213. DOI: [10.1111/2041-210X.12282](https://doi.org/10.1111/2041-210X.12282).
30. The rise of network ecology: Maps of the topic diversity and scientific collaboration.
Borrett, S.R., J. Moody, J. A. Edelmann*.
Ecological Modelling 293: 111-127 [doi: 10.1016/j.ecolmodel.2014.02.019](https://doi.org/10.1016/j.ecolmodel.2014.02.019) Preprint: [arXiv:1311.1785](https://arxiv.org/abs/1311.1785) [q-bio.QM]
29. Comparison of network, neighborhood, and node levels of analysis in two models of nitrogen cycling in the Cape Fear River Estuary.
Hines, D.E.**, S.R. Borrett.
Ecological Modelling. 293: 210-220. [doi: 10.1016/j.ecolmodel.2013.11.013](https://doi.org/10.1016/j.ecolmodel.2013.11.013)

28. Indirect effects and distributed control in ecosystems. Comparative network environ analysis of a seven-compartment model of nitrogen storage in the Neuse River Estuary, USA: Time Series Analysis.
Whipple, S.J., B.C. Patten, S.R. Borrett.
Ecological Modelling 293:161-186. doi: [10.1016/j.ecolmodel.2014.08.025](https://doi.org/10.1016/j.ecolmodel.2014.08.025).
- 2013
27. Unique pattern of molt leads to low intra-individual variation in feather mercury concentrations in penguins
Brasso**, R., B. Drummond***, S.R. Borrett, A. Chiaradia, M. Polito, A. Raya-Rey.
Environmental Toxicology & Chemistry. 32: 2331–2334. doi:[10.1002/etc.2303](https://doi.org/10.1002/etc.2303)
26. Throughflow centrality is a global indicator of the functional importance of species in ecosystems.
Borrett, S.R.
Ecological Indicators 32:182–196. doi:[10.1016/j.ecolind.2013.03.014](https://doi.org/10.1016/j.ecolind.2013.03.014) Preprint: [arXiv:1209.0725](https://arxiv.org/abs/1209.0725) [q-bio.QM].
- 2012
25. A network model shows the importance of coupled processes in the microbial N cycle in the Cape Fear River Estuary.
Hines**, D.E., J.A. Lisa**, B. Song, C.R. Tobias, S.R. Borrett.
Estuarine, Coastal and Shelf Science. 20: 45–75. doi:[10.1016/j.ecss.2012.04.018](https://doi.org/10.1016/j.ecss.2012.04.018)
24. Environ centrality reveals the tendency of indirect effects to homogenize the functional importance of species in ecosystems.
Fann***, S.L. and S.R. Borrett
Journal of Theoretical Biology 294: 74–86. doi:[10.1016/j.jtbi.2011.10.030](https://doi.org/10.1016/j.jtbi.2011.10.030) arXiv:[1110.5385v1](https://arxiv.org/abs/1110.5385v1) [q-bio.PE]
- 2011
23. Equivalence of the ecological network analysis realized input and output oriented indirect effects metric.
Borrett, S.R., M.A. Freeze, & A.K. Salas**.
Ecological Modelling 222:2142–2148. doi: [10.1016/j.ecolmodel.2011.04.003](https://doi.org/10.1016/j.ecolmodel.2011.04.003)
22. Reconnecting environs to their environment.
Borrett, S.R. and M.A. Freeze.
Ecological Modelling 222: 2293–2403. doi: [10.1016/j.ecolmodel.2010.10.015](https://doi.org/10.1016/j.ecolmodel.2010.10.015)
21. Evidence for dominance of indirect effects in 50 trophic ecosystem networks
Salas**, A.K. & S.R. Borrett.
Ecological Modelling 222: 1192-1204. arXiv:[1009.1841v1](https://arxiv.org/abs/1009.1841v1) [q-bio.PE]; doi: [10.1016/j.ecolmodel.2010.12.002](https://doi.org/10.1016/j.ecolmodel.2010.12.002)
- 2010
20. Rapid development of indirect effects in ecosystem networks.
Borrett, S.R., S.J. Whipple, & B.C. Patten.
Oikos 119: 1136–1148. doi: [10.1111/j.1600-0706.2009.18104.x](https://doi.org/10.1111/j.1600-0706.2009.18104.x)
19. Evidence for resource homogenization in 50 trophic ecosystem networks,
Borrett, S.R. & A.K. Salas**.
Ecological Modelling 221: 1710–1716. doi:[10.1016/j.ecolmodel.2010.04.004](https://doi.org/10.1016/j.ecolmodel.2010.04.004).
18. Ecosystem network analysis indicators are generally robust to parameter uncertainty in a phosphorus model of Lake Sidney Lanier, USA.
Kaufman***, A.G. & S.R. Borrett.

Ecological Modelling 221: 1230-1238 [doi:10.1016/j.ecolmodel.2009.12.018](https://doi.org/10.1016/j.ecolmodel.2009.12.018)

2007

17. Equivalence of throughflow– and storage–based environs
Bata, S.A., S.R. Borrett, B.C. Patten, S.J. Whipple, J.R. Schramski, & D.K. Gattie.
Ecological Modelling. 206: 400–406 [doi:10.1016/j.ecolmodel.2007.04.005](https://doi.org/10.1016/j.ecolmodel.2007.04.005)
 16. [Extracting constraints for process modeling.](#)
Bridewell, W., S.R. Borrett, & L. Todorovski.
Proceedings of the Fourth International **Conference on Knowledge Capture** (pp. 87-94). Whistler, BC.
 15. Indirect effects and distributed control in ecosystems: Distributed control in the environ networks of a seven-compartment model of nitrogen flow in the Neuse River Estuary, USA: Time series analysis.
Schramski, J.R., D.K. Gattie, B.C. Patten, S.R. Borrett, B.D. Fath, & S.J. Whipple.
Ecological Modelling 206: 18-30. [doi:10.1016/j.ecolmodel.2007.03.023](https://doi.org/10.1016/j.ecolmodel.2007.03.023)
 14. Indirect effects and distributed control in ecosystems: Comparative network environ analysis of a seven-compartment model of nitrogen flow in the Neuse River Estuary: Time series analysis.
Whipple, S.J., S.R. Borrett, B.C. Patten, D.K. Gattie, J.R. Schramski, & S.A. Bata.
Ecological Modelling 206: 1-17. [doi:10.1016/j.ecolmodel.2007.03.002](https://doi.org/10.1016/j.ecolmodel.2007.03.002)
 13. Gaining integrated understanding of *Phaeocystis spp.* through model-driven laboratory and mesocosm studies.
Whipple, S.J., B.C. Patten, P.G. Verity, M.E. Frischer, J.D. Long, J.C. Nejstgaard, J.T. Anderson, A. Jacobsen, A. Larsen, J. Martinez-Martinez, & S.R. Borrett.
Biogeochemistry 83:293–309. [doi:10.1007/s10533-007-9089-z](https://doi.org/10.1007/s10533-007-9089-z)
 12. A method for representing and developing process models.
Borrett, S.R., W. Bridewell, P. Langley, & K.R. Arrigo.
Ecological Complexity 4: 1–12. [doi:10.1016/j.ecocom.2007.02.017](https://doi.org/10.1016/j.ecocom.2007.02.017)
 11. Functional integration of ecological networks through pathway proliferation.
Borrett, S.R., B.D. Fath, B.C. Patten.
Journal of Theoretical Biology 245: 98–111. [doi:10.1016/j.jtbi.2006.09.024](https://doi.org/10.1016/j.jtbi.2006.09.024)
 10. Environ indicator sensitivity to flux uncertainty in a phosphorus model of Lake Sidney Lanier, USA.
Borrett, S.R. & O.O. Osidele
Ecological Modelling 200: 371–383. [doi:10.1016/j.ecolmodel.2006.08.011](https://doi.org/10.1016/j.ecolmodel.2006.08.011)
- 2006
9. Learning process models with missing data.
Bridewell, W., P. Langley, S. Racunas, & S.R. Borrett.
Proceedings of the Seventeenth European **Conference on Machine Learning** (pp. 557-565). Berlin: Springer.
 8. Plankton development and trophic transfer in sea water enclosures with added nutrients and *Phaeocystis pouchetii*.
Nejstgaard, J.C., M.E. Frischer, P.G. Verity, J.T. Anderson, A. Jacobsen, M.J. Zirbel, A. Larson, J. Martínez-Martínez, A.F. Sazhin, T. Walters, D.A. Bronk, S.J. Whipple, S.R. Borrett, B.C. Patten, & J.D. Long.
Marine Ecology Progress Series 321: 99–121

7. Indirect effects and distributed control in ecosystems: Network environ analysis of a seven-compartment model of nitrogen flow in the Neuse River Estuary, USA—Steady-state analysis.
Gattie, D.K., J.R. Schramski, S.R. Borrett, B.C. Patten, S.A. Bata, & S.J. Whipple.
Ecological Modelling 194: 162–177. [doi:10.1016/j.ecolmodel.2005.10.017](https://doi.org/10.1016/j.ecolmodel.2005.10.017)
6. Indirect effects and distributed control in ecosystems: Temporal variation of indirect effects in a seven-compartment model of nitrogen flow in the Neuse River Estuary, USA—Time series analysis.
Borrett, S.R., S.J. Whipple, B.C. Patten, & R.R. Christian.
Ecological Modelling 194: 178–188. [doi:10.1016/j.ecolmodel.2005.10.011](https://doi.org/10.1016/j.ecolmodel.2005.10.011)
5. Indirect effects and distributed control in ecosystems: Distributed control in the environ networks of a seven-compartment model of nitrogen flow in the Neuse River Estuary, USA—Steady-state analysis.
Schramski, J.R., D.K. Gattie, B.C. Patten, S.R. Borrett, B.D. Fath, C.R. Thomas, & S.J. Whipple,
Ecological Modelling 194: 189–201. [doi:10.1016/j.ecolmodel.2005.10.012](https://doi.org/10.1016/j.ecolmodel.2005.10.012)
4. A MATLAB® function for network environ analysis.
Fath, B.D. & S.R. Borrett.
Environmental Modelling & Software 21: 375–405. [doi:10.1016/j.envsoft.2004.11.007](https://doi.org/10.1016/j.envsoft.2004.11.007)

2005

3. Institutional perspectives on participation and information in water management.
Cowie, G.M. & S.R. Borrett.
Environmental Modeling & Software 20: 469–483. [doi:10.1016/j.envsoft.2004.02.006](https://doi.org/10.1016/j.envsoft.2004.02.006)

2003

2. Structure of pathways in ecological networks: Relationship between length and number.
Borrett, S.R. & B.C. Patten.
Ecological Modelling 170: 173–184. [doi:10.1016/S0304-3800\(03\)00224-2](https://doi.org/10.1016/S0304-3800(03)00224-2)

2002

1. Developing a concept of adaptive community learning: Case study of a rapidly urbanizing watershed.
Beck, M.B., B.D. Fath, A. K. Parker, O.O. Osidele, G.M. Cowie, T.C. Rasmussen, B.C. Patten, B.G. Norton, A. Steinmann, S.R. Borrett, D. Cox, M.C. Mayhew, X.-Q. Zeng, & W. Zeng.
Integrated Assessment 3:299–307.

Book Chapters, Reports, and Other Publications

6. Introduction to the special issue Systems Ecology: A Network Perspective and Retrospective Borrett, S.R., Fath, B.D., & Whipple, S.J.
Ecological Modelling (2014) 293:1–3. [doi: 10.1016/j.ecolmodel.2014.10.005](https://doi.org/10.1016/j.ecolmodel.2014.10.005).
5. Network Ecology (Revised)
Borrett, S.R., R.R. Christian, R., & R.E. Ulanowicz
In: A.H. El-Shaarawi and W.H. Piegorsch (Eds.). Encyclopedia of Environmetrics (2nd edition). John Wiley and Sons: Chinchester (2012). pp. 1767-1772. [doi:10.1002/9780470057339.van011.pub2](https://doi.org/10.1002/9780470057339.van011.pub2)
4. Innovative construction of explanatory scientific models.
Bridewell, W., S.R. Borrett, P. Langley.
In: A.B. Markman and K.L. Wood (Eds.) Tools for Innovation. Oxford University Press, NY. (2009).
3. Complex adaptive hierarchical systems: Consensus (Chapter 4)

Patten, B.C., B.D. Fath, J.S. Choi, S. Bastianoni, S.R. Borrett, S. Brandt-Williams, M. Debeljak, J. Fonseca, W.E. Grant, D. Karnawati, J.C. Marques, A. Moser, F. Müller, C. Pahl-Wostl, R. Seppelt, W.H. Seibold, Y.M. Svirezhev

In: R. Costanza and S.E. Jørgensen (Eds.). *Understanding and Solving Environmental Problems in the 21st Century: Toward a New, Integrated Hard Problem Science*. Elsevier Science, Ltd, Oxford (2002) pp. 95-99.

2. Complex adaptive hierarchical systems: Background (Chapter 3)

Patten, B.C., B.D. Fath, J.S. Choi, S. Bastianoni, S.R. Borrett, S. Brandt-Williams, M. Debeljak, J. Fonseca, W.E. Grant, D. Karnawati, J.C. Marques, A. Moser, F. Müller, C. Pahl-Wostl, R. Seppelt, W.H. Seibold, Y.M. Svirezhev

In: R. Costanza and S.E. Jørgensen (Eds.). *Understanding and Solving Environmental Problems in the 21st Century: Toward a New, Integrated Hard Problem Science*. Elsevier Science, Ltd, Oxford (2002) pp. 41-94.

1. Foresight for Lanier: A Workshop. Summary of Results.

Cowie, G.M., S.R. Borrett, and others.

University of Georgia. January 25, 2001. Athens, GA.

Software

1. enaR: Tools for Ecological Network Analysis

Lau, M. Borrett, S.R., and Hines, D.E.

2012. R package version 1.01. <http://CRAN.R-project.org/package=enaR>.

2015. Version 2.9 Released

2017. Version 3.0 Released

Development hosted on GitHub at <https://github.com/SEELab/enaR>.

1. NEA.m

Fath, B.D. and Borrett, S.R.

2004. Matlab Central File Exchange. <http://www.mathworks.com/matlabcentral/fileexchange/5261-nea-m>.

Presentations & Posters

* postdoc, ** graduate student, *** Undergraduate student

115. Borrett, S.R., Gribble, J. 2019. Indirect flows decentralize throughflow centrality in food webs. International Society for Ecological Modelling, Global Conference 2019. Salzburg, Austria.
114. Borrett, S.R., Scharler, U.M. 2018. Fundamental relationships among flow-based Ecological Network Analysis indicators. Ecological Network Analysis Workshop. Leibniz Centre for Tropical Marine Research (ZMT), Bremen, Germany. (Skype). Invited Presentation
113. Bentley, J., Hines, D.E., Borrett, S.R., Serpetti, N., Fox, C., Reid, D., Heymans, J.J. 2018. How can ocean observation data enhance ecosystem models: An example using long-term stomach records and fisher's knowledge. European Ocean Observing System Conference 2018. Brussels.
112. Bentley, J., Hines, D.E., Borrett, S.R., Serpetti, N., Fox, C., Reid, D., Heymans, J.J. 2018. Incorporating fisher's knowledge and uncertainty analysis into the development of ecosystem models. American Fisheries Society. Atlantic City, NJ.
111. Synan, H. Borrett, S.R. 2018. Identification of statistical dependencies among Ecological Network Analysis metrics used to characterize ecosystem structure and function. Undergraduate Research Showcase, University of North Carolina Wilmington, NC.

110. Brewster, S., Borrett, S.R. 2018. Estimating ecosystem effects of shrimp trawling in Core Sound, North Carolina, USA: using Ecological Network Analysis as an environmental impact analysis tool. Undergraduate Research Showcase, University of North Carolina Wilmington, NC.
109. Borrett, S.R., Moody, J, Sheble, L., Anway, E. 2018. Bibliometric Review and Synthesis of Ecological Network Analysis (2010–2016): A tool for understanding biodiversity. India Biodiversity 2018: Biodiversity, food security, and climate change. Indian Statistical Institute, Kolkata, India. (Skype). [Invited Presentation](#).
108. Borrett, S.R. and Pursuit, J. 2018. The EcoPhoto Project: Applied Learning in Ecology. 12th Conference on Applied Learning in Higher Education. Wilmington, NC.
107. Borrett, S.R. 2017. Reading the Webs of Life: Tools, Theory, and Applications of Ecological Network Analysis. Department of Biology and Marine Biology, University of North Carolina Wilmington, NC.
106. Borrett, S.R., Moody, J, Sheble, L., Anway, E. 2017. Bibliometric Review and Synthesis of Ecological Network Analysis (2010–2016). Workshop: Use of coastal and estuarine food web models in politics and management: The need for an entire ecosystem approach to prevent crises”. Alfred Wegener-Institute Helmholtz-Zentrum für Polar und Meeresforschung, Sylt, Germany. [Invited Keynote Presentation](#).
105. Borrett, S.R. 2017. Ecological Network Analysis for Ecosystem Science, Assessment, & Management: Putting the Pieces Together. Department of Biology and Marine Biology, University of North Carolina Wilmington, Wilmington, NC.
104. Borrett, S.R. 2017. Network Ecology: Using Math to Study Ecosystems. Discrete Math Seminar, Kennesaw State University, Kennesaw, GA. [Invited Presentation](#).
103. Borrett, S.R. 2017. Network Insights into Ecosystem Function: Food Web Organization and Estuarine Nitrogen Cycling. Duke Marine Laboratory, Duke University, Beaufort, NC. [Invited Presentation](#).
102. Borrett, S.R. 2016. Network Insights into Ecosystem Function: Food Web Organization and Estuarine Nitrogen Cycling. Institute of Biology, Free University of Berlin, Berlin, Germany. [Invited Presentation](#).
101. Borrett, S.R. 2016. Network Insights into Ecosystem Function: Food Web Organization and Estuarine Nitrogen Cycling. Leibniz- Institute of Freshwater Ecology and Inland Fisheries (IGB). Berlin & Neuglobsow, Germany. [Invited Presentation](#).
100. Borrett, S.R. 2016. Applying Ecological Network Analysis to Understand Changing Coastal Ecosystems. ECSA 56 2016, Bremen, Germany. [Invited Keynote Presentation](#).
99. Borrett, S.R. 2016. Review and synthesis of five flow decompositions techniques in Ecosystem Network Analysis. The International Society for Ecological Modelling Global Conference 2016, Towson, MD.
98. Borrett, S.R., Fath, B.D., Kazanci, C. 2016. Proposed changes in the mathematical notation used for Ecosystem Network Analysis for clearer communication. The International Society for Ecological Modelling Global Conference 2016, Towson, MD. (poster)

97. Hines^{**}, D.E., Borrett, S.R. 2016. Sensitivity and uncertainty analysis for network flow models: a comparative ecosystem application. The International Society for Ecological Modelling Global Conference 2016, Towson, MD. (poster)
96. Hines^{**}, D.E., Borrett, S.R. 2015. How what you don't know affects what you do know: Exploring an application of a linear inverse modeling uncertainty analysis on network models. 100th Annual Meeting, Ecological Society of America, Baltimore, MD.
95. Borrett, S.R., Hines^{**}, D.E. 2015. Six general ecosystem properties tend to be more intense in biogeochemical cycling network than in trophic webs. 100th Annual Meeting, Ecological Society of America, Baltimore, MD.
94. Carrera^{***}, L. Hines^{**}, D.E., Borrett, S.R. 2015. Preliminary Food web of the Cape Fear River Estuary. Undergraduate Research Showcase, Center for Undergraduate Research and Fellowships. April.
93. Sosnowski^{**}, A. C., Ghoneim, E., Burke, J. J., Borrett, S.R., Hines, E., Maddalena, D. 2015. Spatio-temporal analysis of flooding extent employing a MODIS vegetation proxy in the Sudd wetland of South Sudan. Association of American Geographers Annual Meeting, Chicago, IL.
92. Gomez^{**}, E., Peterson, B., Borrett, S.R, La Peyre, M. 2015. A dynamic ecological and economic model linking oyster reef bioenergetics to final ecosystem services. 44th Benthic Ecology Meeting, Quebec City, Quebec, Canada.
91. Borrett, S.R. 2015. Tracing the connections in ecosystems with network analysis: theory and application. Department of Biology and Physics, Kennesaw State University, GA. (Jan. 28). Invited presentation.
90. Gomez^{**}, E., Peterson, B., Borrett, S.R., Dvarskas, A., Posey, M., Alphin, T., Wilgins, E. 2014. A dynamic ecological and economic model linking oyster reef bioenergetics to final ecosystem services. A Community on Ecosystem Services, Dec. 8-12. Washington, DC.
89. Sterling^{***}, A., Echevarria^{**}, M., Borrett, S.R., Taylor, A. 2014. *Swimming under the influence: Effect of algal toxins on the behavior of the marine ciliate Favella sp.* 36th Southeastern Phycological Colloquy, Wilmington, NC.
88. Borrett, S. R. Hines^{**}, D.E., Singh^{**}, P., Lau^{*}, M.K. 2014. *enaR: a tool for ecosystem network analysis.* Statistical and Applied Mathematical Sciences Institute workshop on Mathematical and Statistical Ecology. Research Triangle, NC. (Poster)
87. Borrett, S. R., Lau^{**}, M.K., Hines^{**}, D.E. 2014. *enaR: An R package that facilitates comparison of ecosystem structure and function with network analysis.* 43rd Benthic Ecology Meeting, Jacksonville, FL.
86. Hines^{**}, D.E., Lisa^{**}, J.A., Song, B., Tobias, C.R., Borrett. 2014. *A network model comparison predicts how seawater intrusion will alter coupling among estuarine nitrogen cycling processes.* 43rd Benthic Ecology Meeting, Jacksonville, FL.
85. Oxe^{**}, E.A., Borrett, S.R., Hines^{**}, D.E., Lisa^{**}, J.A., Song, B., Tobias, C.R. 2014. *Comparison of process coupling in the nitrogen cycle between the New River and Cape Fear River estuaries.* 43rd Benthic Ecology Meeting, Jacksonville, FL.

84. Borrett, S. R., 2014. *Connecting the dots: Developments in ecosystem network theory and the impact of climate change on estuarine N cycling*. Department of Zoology, University of Calcutta, Calcutta, India. (Mar. 1) Invited presentation.
83. Borrett, S. R., Carter^{***}, M., Hines, D.E^{**}. 2014. *Environ properties tend to be more intense in biogeochemical cycling models than in trophic networks*. Invited presentation. International Conference on Environmental Biology and Ecological Modelling, Visva-Bharati University, Santiniketan, India (Feb. 26).
82. Lau^{**}, M., Borrett, S.R. 2013. *enaR: Free, open-source tools for ecological network analysis*. Ecological Society of America Meeting (ESA), Minneapolis, MN, August 2013
81. Borrett, S.R., Moody, J. 2013. *Topics in network ecology and the scientific community that studies them*. Systems Ecology: A Network Perspective and Retrospective. University of Georgia. (April).
80. Hines^{**}, D.E., Borrett, S.R. 2013. *Node-level and whole-network indicators of the impacts of sea level rise on an estuarine nitrogen cycle*. Systems Ecology: A Network Perspective and Retrospective. University of Georgia. (April).
79. Oxe^{**}, E.A., Hines^{**}, D.E., Borrett, S.R. 2013. *Network mutualism and synergism in a model of nitrogen cycling in the Cape Fear River Estuary, NC*. Systems Ecology: A Network Perspective and Retrospective. University of Georgia. (April).
78. Whipple, S.J., Patten, B.C., Borrett, S.R. 2013. *Evaluation of model size, topology, and currency in systems analysis: comparative network environ analysis and nitrogen model time series of the Neuse River estuary, USA*. Systems Ecology: A Network Perspective and Retrospective. University of Georgia. (April).
77. Borrett, S.R. 2013. *Throughflow centrality reveals important species in ecosystems and environmental impacts of shrimp trawling in Core Sound, NC*. Duke Network Analysis Center, Social Science Research Institute, Duke University. (Feb. 26). Invited presentation.
76. Borrett, S.R. 2012. *Connecting the dots: Developments in ecosystem network theory and the impact of climate change on estuarine N cycling*. Department of Biology, University of North Carolina Charlotte. (Oct. 26). Invited presentation.
75. Mejaski^{**}, J., Borrett, S.R. 2012. *Network analysis of the urban water metabolism of Wilmington, North Carolina: Evaluating alternative recycling scenarios for city sustainability*. 4th International EcoSummit, Columbus, Ohio. (Poster, Oct, 4)
74. Hines^{**}, D.E., Lisa^{**}, J.A., Song, B., Tobias, C.R., Borrett, S.R. 2012. *Simulating the impact of sea level rise on the microbial nitrogen cycle in tidally influenced regions of the Cape Fear River Estuary, NC, USA*. 4th International EcoSummit, Columbus, Ohio. (Oct, 4)
73. Borrett, S.R., Lau^{**}, M.K. 2012. *An R package for Ecological Network Analysis*. 4th International EcoSummit, Columbus, Ohio. (Oct, 5)
72. Whipple, S.J., Patten, B.C., Borrett, S.R. 2012. *Evaluation of Model Size and Currency in Systems Analysis: Comparative Network Environ Analysis of Carbon and Nitrogen Model Time Series for the Neuse River Estuary, USA*. 4th International EcoSummit, Columbus, Ohio. (Oct, 5)

71. Borrett, S.R. 2012. *Connecting the Dots: Development in ecosystem theory and applications of ecosystem network analysis*. Department of Biology and Marine Biology, University of North Carolina Wilmington. (August 31)
70. Borrett, S.R., Deehr^{**}, R., Johnson, J.C., Luczkovich, J. 2012. *Centrality Analysis Shows Ecosystem Impact of Trawling in Core Sound, North Carolina, USA*. American Fisheries Society Annual Meeting, St. Paul, MN.
69. Beblo, J.^{***}, Borrett, S.R. 2012. *A network analysis comparison of energy flow through the Dublin Bay and Baie de Somme intertidal ecosystem*. Undergraduate Research Showcase, UNCW. (Poster) Winner of Biology and Marine Biology undergraduate poster award.
68. Hines^{**}, D.E., Lisa^{**}, J.A., Song, B., Tobias, C.R. and Borrett, S.R. 2012. *Environ analysis of a nitrogen mass balance network model*. 112th General meeting of American Society for Microbiology, San Francisco, CA
67. Hines^{**}, D.E., Lisa^{**}, J.A., Song, B., Tobias, C.R., Borrett, S.R. 2012. *Environ analysis of a nitrogen mass balance network model: quantifying microbial interactions in an estuarine nitrogen cycle*. UNCW Graduate Student Symposium, UNCW and Wilmington Information Technology Expo (WITX), Department of Computer Science, UNCW.
66. Borrett, S.R. 2012. *Connecting the dots: Developments in ecosystem theory and an application of ecosystem network analysis to investigate nitrogen cycling in the Cape Fear River Estuary, NC*. Department of Biology, Eastern Carolina University. (Feb. 23). Invited presentation.
65. Borrett, S.R. 2012. *Ecological network analysis: recent work and future opportunities at UNCW*. Department of Computer Science, UNCW. Invited presentation.
64. Borrett, S.R. 2011. *Undergraduate learning through biological research*, Center for Teaching Excellence, Teaching Celebration, UNCW.
63. Hines^{**}, D.E., Lisa^{**}, J.A., Song, B., Tobias, C.R., Borrett, S.R. 2011. *Modeling the effects of sea level rise on estuarine nitrogen cycle: examining the fate and transport of nitrogen in the Cape Fear River Estuary, NC, USA*. 21st Biennial Conference of the Coastal and Estuarine Research Federation. Daytona Beach, FL.
62. Hines^{**}, D.E., Lisa^{**}, J.A. Song, B., Borrett, S.R. 2011. *Sea level rise and the alternative fates of nitrogen in the Cape Fear River Estuary, NC, USA: a microbial view*. Biennial Meeting, International Society for Ecological Modelling, Beijing, China.
61. Carter^{***}, M., Borrett, S.R. 2011. *Indirect effects, network homogenization, and network aggradation are stronger in biogeochemical networks than in trophic ecosystem models*. Biennial Meeting, International Society for Ecological Modelling, Beijing, China. (Poster)
60. Borrett, S.R. 2011. *Node throughflow is a global centrality measure of species importance in ecosystem flow networks*. Biennial Meeting, International Society for Ecological Modelling, Beijing, China.
59. Missik^{***}, J., Coates, K., Meier, A.J., Kessler, B., **Borrett, S.R.** 2011. *Influences of microbial networks on food webs*. Annual Meeting, Ecological Society of America. Austin, TX. (Poster)

58. Borrett, S.R. 2011. *Importance of indirect effects in ecosystems revealed by network analysis*. Northern Arizona University. Flagstaff, AZ. Invited presentation.
57. Borrett, S.R. 2010. *Network Analysis Exposes Hidden Relationships in Ecological Systems*. Duke Network Analysis Center, Duke University. Durham, NC. Invited presentation.
56. Himes, M., Metwally^{***}, A. Borrett, S.R., Bourdelais, A. Taylor, A.R. 2010. *Do algal toxins affect sensory behavior of marine ciliates?* Southeastern Phycological Colloquy, UNCW Center for Marine Science, NC. (Poster)
55. Borrett, S.R., Whipple, S.J., Patten, B.C. 2010. *Rapid Development of Indirect Effects in Ecological Networks*. Statistical and Applied Mathematical Sciences Institute workshop on Complex Networks. Research Triangle, NC. (Poster)
54. Borrett, S.R., Salas^{**}, A.K. 2010. *Evidence for resource homogenization in 50 trophic ecosystem networks*. Annual Meeting, Ecological Society of America. Pittsburgh, PA.
53. Missik^{***}, J.E., Meier, A.J., Borrett, S.R., Ayers, K., Kessler, B. 2010. *Addition of microbial loops to food webs: Increases in connectivity, pathway proliferation, and dominant eigenvalues*. Annual Meeting, Ecological Society of America. Pittsburgh, PA. (Poster)
52. Borrett, S.R. 2009. *Resource roadmaps reveal how ecosystem connectivity influences species and whole –system functioning*. Biology Department, University of North Carolina Wilmington. Wilmington, NC.
51. Borrett, S.R. 2009. Network models for (soil) ecology. NIMBioS Investigative Workshop: New Soil Black Box Math Strategies, NIMBioS, Knoxville, TN. Invited presentation.
50. Borrett, S.R. 2009. *Dominance of indirect effects in ecological networks: Holoecology Emerging*. Institute of Marine Science, University of North Carolina Chapel Hill, Morehead City, NC. Invited presentation.
49. Borrett, S.R., Freeze, M.A., Salas^{**}, A. K. 2009. *Reconnecting environs to their environments*. Meeting of the International Society for Ecological Modelling, Quebec City, Canada.
48. Freeze, M.A., Borrett, S.R., Salas^{**}, A. K. 2009. *Sufficient conditions for threshold insensitivity of network environ analysis dominance of indirect indicators to boundary input*. Meeting of the International Society for Ecological Modelling, Quebec City, Canada.
47. Salas^{**}, A.K., Borrett, S.R. 2009. *Evidence for the dominance of indirect effects in trophically-based ecosystem networks*. Meeting of the International Society for Ecological Modelling, Quebec City, Canada.
46. Whipple, S.J., Borrett, S.R., Patten, B.C. 2009. *Storage-based comparative network environ analysis of a seven-compartment model of nitrogen flow in the Neuse River estuary, USA—Time series analysis*. Meeting of the International Society for Ecological Modelling, Quebec City, Canada.
45. Fann^{***}, S.L., Borrett, S.R. 2009. *Positional importance of species in ecosystems: considering direct and indirect effects through a network environ analysis approach*. Meeting of the International Society for Ecological Modelling, Quebec City, Canada.

44. Kaufman^{***}, A., Borrett, S.R. *Ecosystem network analysis indicators are generally robust to parameter uncertainty in a phosphorus model of Lake Sidney Lanier, USA*. Meeting of the International Society for Ecological Modelling, Quebec City, Canada. and UNCW CSURF Annual Showcase.
43. Borrett, S.R. 2009. *Network architecture and the development of indirect effects*. North Carolina State University, Biomath group, Raleigh, NC (April 16th). Invited presentation.
42. Fann^{***}, S.L. Borrett, S.R. 2009. *Quantifying species potential for controlling ecosystem dynamics*. UNCW CSURF Annual Showcase.
41. Fann^{***}, S.L. Borrett, S.R. 2009. *Measuring control in ecosystems: interpreting the eigenspectrum of the ecological network analysis flow intensity matrix*. CAA Undergraduate Research Conference Towson, MD.
40. Salas^{**}, A.K., Borrett, S.R. 2009. *Modeling indirect selective in a co-evolving community: preliminary work*. Darwin's Legacy: Evolution's Impact on Science & Culture: A multidisciplinary conference, Wilmington, NC.
39. Muzyczek^{**}, L.A., Borrett, S.R., Finelli, C.M. 2009. *Feeding behavior of *Upogebia affinis*: Food source partitioning and effects on benthic-pelagic coupling*. 38th Benthic Ecology Meetings, Corpus Christi, TX.
38. Borrett, S.R., Whipple, S.J., Patten, B.C. 2008. *Rapid development of indirect effects in ecological networks*. Annual Meeting, Ecological Society of America. Milwaukee, WI. and at UGA Ecological Network Analysis Meeting, Athens, GA.
37. Bowers^{**}, J.L., Meier, A.J., and Borrett, S.R. 2008. *Eigenvector analysis of connectivity in food webs*. Annual Meeting, Ecological Society of America. Milwaukee, WI.
36. Bowers^{**}, J.L., Meier, A.J., and Borrett, S.R. 2008. *Use of eigenvector and network environ analysis (NEA) in the quantification of keystone species*. Annual Meeting, Society for Conservation Biology. Chattanooga, TN.
35. Borrett, S.R. 2008. *Hidden links that sustain ecosystems: the rapid development of indirect effects in the Neuse River Estuary*. Eastern Carolina University, NC. Jan. 24th. Invited Presentation.
34. Borrett, S.R. 2007. *Network architecture determines the development of indirect effects in ecosystems*. Western Kentucky University, Bowling Green, KY. Nov. 30. Invited Presentation.
33. Borrett, S.R. 2007. *Searching for ecosystem models that explain phytoplankton dynamics in the Ross Sea*. University of Georgia, Athens, GA. Invited Presentation.
32. Borrett, S.R. 2007. *Searching for ecosystem models that explain phytoplankton dynamics in the Ross Sea*. USGS, Menlo Park, CA. Invited Presentation.
31. Borrett, S.R., W. Bridewell, P. Langley, K.R. Arrigo. 2007. *Value of information in modeling the Ross Sea ecosystem*. Polar Marine Science Gordon Research Conference. Ventura, CA.
30. Borrett, S.R. 2007. *Hidden links that sustain ecosystems*. University of North Carolina, Wilmington, NC. Invited presentation

29. Borrett, S.R., W. Bridewell, P. Langley, K.R. Arrigo. 2006. *Process sensitivity analysis for ecological modeling*. 5th International Conference on Ecological Informatics. Santa Barbara, CA.
28. Borrett, S.R., W. Bridewell, P. Langley. 2006. *Computational discovery of process models of aquatic ecosystems*. 91st Annual Meeting, Ecological Society of America. Memphis, TN.
27. Borrett, S.R., W. Bridewell, P. Langley, K.R. Arrigo. 2006. *A hierarchical process model of the Ross Sea ecosystem*. Eos Trans. AGU, 87(36), Ocean Sciences Meeting Supplement, Abstract OS43K-06.
26. Borrett, S.R. 2005. *Ecosystem organization and transformation: The role of network architecture in the development of indirect effects*. Dissertation Defense. Institute of Ecology, Athens, GA.
25. Borrett, S.R., O.O. Osidele, B.C. Patten, M.B. Beck. 2005. *Environ sensitivity to flux uncertainty in a phosphorus model of Lake Sidney Lanier, USA: Preliminary Results*. Annual International Meeting, Institute of Biological Engineering. Athens, GA.
24. Patten, B.C., S. Bata, S.R. Borrett, B.D. Fath, D.K. Gattie, J.R. Schramski, H.J. Turk, S.J. Whipple. 2004. *Indirect effects and distributed control in ecosystems 1. Environs and network environ analysis: Introduction and overview*. Fourth European Conference on Ecological Modelling. Bled, Slovenia.
23. Gattie, D.K., J.S. Schramski, S.R. Borrett, B.C. Patten, H.J. Turk. 2004. *Indirect effects and distributed control in ecosystems 2. Environ analysis of a seven-compartment model of nitrogen flow in the Neuse River Estuary, USA: The static case*. Fourth European Conference on Ecological Modelling. Bled, Slovenia.
22. Borrett, S.R., S.J. Whipple, B.C. Patten. 2004. *Indirect effects and distributed control in ecosystems 3. Temporal variation of indirect effects in a nitrogen flow model of the Neuse River Estuary, USA: time series analysis*. Fourth European Conference on Ecological Modelling. Bled, Slovenia.
21. Whipple, S.J., S.R. Borrett, B.C. Patten. 2004. *Indirect effects and distributed control in ecosystems 4. Comparative environ analysis of a seven-compartment model of nitrogen flow in the Neuse River Estuary, USA: the discrete time case*. Fourth European Conference on Ecological Modelling. Bled, Slovenia.
20. Schramski, J.S., D.K. Gattie, B.C. Patten, S.J. Whipple, S.R. Borrett, and B.D. Fath. 2004. *Indirect effects and distributed control in ecosystems 5. Distributed Control in the environ network of a seven-compartment model of nitrogen flow in the Neuse River Estuary, USA: static analysis*. Fourth European Conference on Ecological Modelling. Bled, Slovenia.
19. Borrett, S.R. and B.D. Fath. 2004. *Pathway proliferation in ecological networks*. Annual Meeting, Ecological Society of America. Portland, OR.
18. Gattie, D.K., J.S. Schramski, S.R. Borrett, B.C. Patten, H.J. Turk, S.J. Whipple. 2004. *Analysis of ecosystems as a network of environments*. Annual Meeting, American Ecological Engineering Society. Fayetteville, AR.

17. Borrett, S.R. 2004. *Biodiversity determines pathway proliferation in ecological networks: Preliminary results*. Graduate Student Symposium, Institute of Ecology, University of Georgia. Athens, GA.
16. Whipple, S.J., B.C. Patten, S.R. Borrett. 2003. *Phaeocystis: a biocomplex life-form on a biogeochemically complex planet: using conceptual modeling to guide team research*. Meeting of Phaeocystis SCOR Work Group. Savannah, GA.
15. Patten, B.C., S.R. Borrett, S.J. Whipple, R.R. Christian, C.R. Thomas. 2003. *Discrete-time dynamic environ analysis of indirect effects in ecological networks: basic considerations*. Annual Meeting, Ecological Society of America. Savannah, GA.
14. Borrett, S.R. 2003. *Development of environ indirect effects in ecological flow networks: initial lessons from the Neuse River Estuary*. Annual Meeting, Ecological Society of America. Savannah, GA.
13. Gattie, D.K. and S.R. Borrett. 2003. *Indirect effects in transport networks*. Annual Meeting, American Ecological Engineering Society. College Park, MD.
12. Gattie, D.K. and S.R. Borrett. 2003. *Network indirect effects in transport networks: integral elements of system complexity*. Annual International Meeting, Institute of Biological Engineering. Athens, GA.
11. Patten, B.C., S.J. Whipple, S.R. Borrett. 2003. *Pattern and process in the steady-state transport of energy and matter in model ecosystems: perspectives from the theory of environs*. Annual International Meeting, Institute of Biological Engineering. Athens, GA.
10. Borrett, S.R. 2003. *Network indirect transactions in the Neuse River Estuary*. Graduate Student Symposium, Institute of Ecology, University of Georgia. Athens, GA.
9. Borrett, S.R. 2002. *Investigating pathway proliferation in ecological networks*. Annual Meeting, Ecological Society of America. Tucson, AZ.
8. Borrett, S.R. 2002. *Introduction to environs*. Long Term Ecological Research Program Network Analysis Workshop. Sevilleta, NM.
7. Borrett, S.R. and B.C. Patten. 2002. *System size and connectance determine the relationship between pathway length and the number of pathways in ecological networks: preliminary results*. Graduate Student Symposium, Institute of Ecology, University of Georgia. Athens, GA.
6. Borrett, S.R. 2001. *Incorporating citizen knowledge into an ecosystem model of Flowery Branch Bay: an initial science-based model*. 3rd European Ecological Modelling Conference, International Society for Ecological Modelling European Chapter. Dubrovnik, Croatia.
5. Beck, M.B., A.K. Parker, T.C. Rasmussen, B.C. Patten, S.R. Borrett, B.G. Norton, A. Steinemann. 2001. *Community values and the long-term ecological integrity of rapidly urbanizing watersheds*. EPA-NSF Water and Watershed Grant Meeting. San Francisco, CA.
4. Borrett, S.R. 2001. *Sources of system complexity in the Lake Lanier ecosystem, Georgia*. Annual Meeting, Ecological Society of America. Madison, WI.
3. Borrett, S.R. 2001. *Exploring systems complexity*. Graduate Student Symposium, Institute of Ecology, University of Georgia. Athens, GA.
2. Borrett, S.R., B.D. Fath, B.C. Patten. 2000. *Incorporating stakeholder concerns into a lake ecosystem model: a heuristic tool for Lake Lanier*. Graduate Student Symposium, Institute of

Ecology, University of Georgia. Athens, GA; also presented at 9th Annual Conference, Southeastern Division, North American Lake Management Society. Columbus, GA.

1. Borrett, S.R., B.D. Fath, B.C. Patten. 2000. *Incorporating stakeholder concerns into a lake ecosystem model: A heuristic tool for Lake Lanier*. Ecosummit2000. Halifax, Nova Scotia, Canada.

FUNDING

Funded (Totals: **Extramural:** \$500,411 as Co-PI, \$299,929 as Collaborator; **Intramural:** \$65,506)

UNCW Office for International Programs travel grant (**\$1200**) to attend the 2017 Workshop and research collaboration in Sylt, Germany.

UNCW ETEAL. *Ecological Modeling to Enhance Teaching and Learning*. Borrett, S.R. **\$3,500** for 8/2017-5/2018.

UNCW CTE. *Classroom enhancement grant*. Borrett, S.R. **\$2,000** for 2017. Funds to purchase a camera lens to help bring the outside ecology world into the classroom.

NSF: Robert Noyce Teacher Scholarship Program--Capacity Building. *University of North Carolina Wilmington (UNCW) project INCISE (Integrated Certificate in STEM Education)*. Moallem, M. (PI) with others. Borrett as supporting collaborator. **\$299,929**. 2015-2017.

UNCW Office for International Programs travel grant (**\$1000**) to attend the 2016 ECSA 56 Conference. Bremen, Germany.

UNCW Office for International Programs travel grant (**\$1000**) to attend the 2014 International Conference on Environmental Biology and Ecological Modelling, Visva-Bharati University, Santiniketan, India.

UNCW Cahill Award: *Creating interdisciplinary capacity and collaborations for ecological network analysis through an immersion at the Duke Network Analysis Center*. Borrett, S.R. **\$2,331** for 1/2013-12/2013.

Center for Teaching Excellence Summer Pedagogy Development Initiatives. *Development of a Systems Thinking Learning Module for UNCW*. UNCW. **\$3500**. Borrett, S.R (PI). 2013.

Friends of UNCW. *Funds to purchase the ELMO TT-12 Interactive Document Camera*. PIs Pabst, A. Borrett, S.R. **\$885**. 2013.

Duke-UNC Oceanography Consortium. *Proposal for 1-week of ship time in aid of research in Onslow Bay, NC*. Finelli, C. Freshwater, W., Long, Z., Borrett, S.R. Estimated **~\$50,000** value. 2013.

UNCW Quality Enhancement Plan Pilot Grant. *UNCW: Enhancing applied learning through explorations of the natural world*, PIs: Frampton, A., Emslie, S, Finelli, C, Van Tuinen, M., Long, Z, Pyott, S., Pabst, A. and Borrett, S.R. **\$13,390**. 2011.

UNCW Quality Enhancement Plan Pilot Grant. *Experience Research: Enhancing the CSURF program to promote engagement in research as applied learning*. PIs: Bruce, K. E., Atwill, W. D., Kelley, P.H., Borrett, S.R. **\$31,500**. 2011.

NSF: Collaborative Research: *Impact of sea level rise on sedimentary nitrogen removal processes in tidal freshwater ecosystem*. B.K. Song (Lead PI), S.R. Borrett (Co-PI Responsible for Modelling). **\$500,411** for 2010-2013.

NECSent Catalysis Meeting. *Ecological Models and Social Networks: How evolutionary forces shape networks and communities*. Duke Network Analysis Center (Moody, J lead PI with 11 collaborators including S.R. Borrett). Workshop Funded for 2012-2013.

UNCW Office for International Programs travel grant (**\$1500**) to attend the 2011 International Society for Ecological Modelling meeting in Beijing, China. I escorted one graduate and one undergraduate student to the meeting.

UNCW College of Arts and Sciences, *Summer Curriculum Development Initiative*. Revised the Ecology Laboratory (BIOL366) to (1) Better align the course activities and assessment with the departmental and university learning outcomes; (2) Formalize the laboratory report format so that it is consistent across labs in BIOL 366 and makes use of a biological writing text recently adopted by the department; and (3) Integrate the use of spreadsheets (e.g. Microsoft Excel) to teach the students to organize, manage, and analyze biological data, **\$3,500**.

UNCW Biology and Marine Biology Equipment Committee. We requested funds for a departmental video camera to record departmental seminars so that students can practice critiquing science presentations and witness and critique their own presentations. This purchase was targeted to help students in senior seminars, BIO495, **\$600**. 2008

UNCW Special Tenure-Track Faculty Travel Fund (**\$1000**) and Office for International Programs (**\$600**) for travel to 2009 International Society for Ecological Modelling Meeting, UNCW. I Escorted one graduate and one undergraduate student to the meeting.

University of Georgia. University-wide Dissertation Completion Award, Ten months of funding (**\$15,000**) to complete dissertation. University of Georgia, Athens, GA.

University of Georgia OVPR International travel funds. (a) 2004. Fourth European Conference for Ecological Modelling. Bled, Slovenia. (b) 2001. International Society for Ecological Modelling, European Chapter meeting. Dubrovnik, Croatia. (c) 2000. Ecosummit2000. Halifax, Canada.

TEACHING

Classroom, Laboratory, & Field

Systems Ecology. 1-week intensive graduate course. Beijing Normal University, Summer 2013. Invited by Professor Bin Chen. Co-taught with J.R. Schramski.

Systems Ecology and Ecosystem Network Analysis. Short course for graduate and undergraduate students. UNCW: SU2011

Fundamentals of Ecological Modeling. Graduate lecture and laboratory. UNCW: 2007, 2008, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017. Co-taught with K.R. Arrigo at Stanford University in 2006.

Ecological Thought: Past to Present. Graduate seminar course. UNCW: F 2008, F 2010, F 2011. Co-developed and co-taught the course at the University of Georgia with B.C. Patten and S.J. Whipple where it became a required course for UGA ecology graduate students.

Readings in Ecology. Graduate seminar course. UNCW Sp 2017. Co-taught with Dr. Z. Long.

Introduction to Ecology. Undergraduate course. Large lecture format with 36-190 students. UNCW: SP 2008, SP 2009, SP 2010, SP & SU 2011, SP & SU 2012, SU 2013, SP & SU 2014, SP & SU 2015, SU 2016, Sp & Su 2017, Sp & Su 2018

Ecology Laboratory. Undergraduate course. Faculty coordinator responsible for curriculum, lab preparation, and managing and preparing 3-5 TAs. I also occasionally teach sections. UNCW: SP 2008, F 2009, SP & SU 2010, SP & SU 2011, SP & SU 2012, SU 2013, SP & SU 2014, SP & SU 2015, SU2016, SP & SU 2017, SP & SU 2018

Survey of Biological Research. Undergraduate Honors Seminar. UNCW: F 2013

Living in a Connected World: The Power, Beauty, Science, and Mathematics of Networks. Undergraduate Honors Seminar. UNCW: F 2015.

Senior Seminar: Bringing the Biosphere Home. Undergraduate seminar. UNCW: 2008

Ecosystem Complexity in the Marine Environment – Seeking an Answer to the Question: What is Biocomplexity? Skidaway Institute of Oceanography: 2003. Three-week short course for undergraduate and graduate students. Co-instructors: P.G. Verity, M.E. Frischer, B.C. Patten, S.J. Whipple. Skidaway, GA.

Theory of Systems Ecology, Guest Lecturer and Teaching Assistant for graduate course. Institute of Ecology 2002. Professor: B.C. Patten. Athens, GA.

Cellular Biology and Anatomy and Physiology. Undergraduate teaching assistant at Austin College. 1995–1997. Professor: W. Meyer. Sherman, TX.

Workshops & Tutorials

Ecological Network Analysis. 2019. International Society for Ecological Modelling. Global Conference 2019. Salzburg, Austria. With U. Scharler, B. Fath, C. Kazanci. (24 participants)

Ecological Network Analysis with enaR. 2017. Tutorial following the ENA meeting at the Alfred Wegener-Institute Helmholtz-Zentrum für Polar und Meeresforschung, Sylt, Germany. (14 participants).

Ecological Network Analysis. 2016. ECSA 56 Meeting. Bremen, Germany. 2-hr workshop on constructing and analyzing network models for ecology (~60 participants).

Network Analysis. 2016. International Society for Ecological Modelling. Towson, MD. Two-day workshop on constructing and analyzing network models for ecology (24 participants enrolled).

Ecological Network Analysis. 2015. Ecological Society of America, Baltimore, MD. With M.K. Lau and C. Kazanci. ¾ day introduction to network ecology concepts, use, and tools (EcoNet and enaR).

Ecological Network Analysis. 2011. Northern Arizona University. 1-Day workshop.

Network Environ Analysis: Windows into Eco-System Environments 2007. Western Kentucky University. 1-Day workshop.

Mentoring

Primary Mentor

Faculty

2. Lucas M. Layman. Assistant Professor, Department of Computer Science, UNCW (2017-2018)
1. Todd LaMaskin. Assistant Professor, Department of Geology and Geography, UNCW (2012–2016)

Ph.D.

1. David E. Hines. PhD. Marine Biology (2011 – 2015). *Assessing the effects of seawater intrusion on an estuarine nitrogen cycle through network modeling*. Next Step: EPA Postdoctoral Fellow.

M.S.

6. Alicia Cheripka. M.S. Marine Biology (2018). *Managing shifting species in MPA networks: disentangling the effects of climate velocity, interspecific competition, and MPA configuration*. Initiated her project under the direction of Dr. J. Will White at UNCW. I agreed to serve as her local mentor to complete her degree at UNCW. Next Step:
5. Evan Anway. M.S. Biology (2018). *Higher Resource Availability Increases Average Body Size and Total Respiration Rate in Pitcher Plant Ecosystems*. Next Step: ERM: Environmental Resource Management, SC.
4. Emily Oxe. M.S. Biology 2014. *A Comparison of Recycling and Process Coupling in the Nitrogen Cycle of Two North Carolina Estuaries*. Next Step: Lab Coordinator for VA Community College.
3. John Mejaski. M.S. Marine Biology. 2013. *Ecological Network Analysis, A tool for Urban Water Metabolism: Case Study of Wilmington, North Carolina*.
2. Youri N. Nelson. M.S. Applied Mathematics 2011. (Co-Advisor with Dr. Feng) *Hierarchical inductive process modeling and analysis*. Next Step: Mormon Mission.
1. Andria K. Salas. M.S. Marine Science. 2010. *Indirect effects in trophic and evolutionary networks*. Next Step: Ph.D. program in Biology at the University of Texas at Austin.

Graduate Directed Independent Study Students

Lisa Hollenshead, Spring 2014, Spatial Network Analysis

David Hines, Spring 2013, Network Environ Analysis

John Mejaski, Spring 2013, Network Environ Analysis

Emily Oxe, Spring 2013, Network Environ Analysis

Carline Buckner, Fall 2012, Data Analysis & Bioinformatics

David Hines, Fall 2012, Data Analysis & Bioinformatics

Jessica Lisa, Fall 2012, Data Analysis & Bioinformatics

Jessica Lisa, Spring 2012, Ecological Modelling

David Hines, Fall 2011, Systems Ecology & Ecoinformatics

Lindsey Deignan, Fall 2011, Systems Ecology & Ecoinformatics

John Mejaski, Fall 2011, Systems Ecology & Ecoinformatics

Stephen Midway, Spring 2011, Ecological Modelling

Tiffany Lewis, Spring 2009, Ecological Modelling

Andria Salas, Spring 2009, Ecological Modelling

Louis Muzyczek, Spring 2009, Ecological Modelling

Graduate Research Internships or Short Term Visitors to Laboratory

Oksana Buzhdygan, Winter 2016
(Institute of Biology, Freie Universität, Berlin, Germany)

Elizabeth Gomez, Summer 2014 (Stony Brook University)

Pawandeep Singh, Summer 2014
(Visva-Baharati University, India)

Matt Lau, Summer 2011 (Northern Arizona University)

Undergraduate Honors Theses

4. Lindsey Bockover. Honors Thesis (B.S. Biology, 2018). *Ammonium concentration and species composition inside the Sarracenia purpurea, the purple pitcher plant.*
3. Sarah Brewster. Honors Thesis (B.S. Marine Biology, 2018). *Estimating ecosystem effects of shrimp trawling in core sound, North Carolina, USA: Using Ecological Network Analysis as an environmental impact analysis tool.*
2. Sarah L. Fann. Honors Thesis (B.S. Marine Biology and Statistics, 2010). *Environ centrality quantifies the relative roles of species in generating ecosystem activity.* Next Step: Fulbright Scholarship in Australia.
1. Anthony G. Kaufman. Honors Thesis (B.S. Marine Biology, 2009) *Ecological network analysis indicators are robust to flux uncertainty in Lake Sidney Lanier, USA.* Next Step: Completed MS degree at the University of Maryland.

Undergraduate Directed Independent Study Students

Sallie A. Mathis, F 2017

Tanner Schwartz, 2015-2016

John Webber, 2011

Amanda Valois, F 2017

Lilianna Carrera, 2014-2015

Drew Braden, 2010

Lindsey Bockover, F 2017

Nathalie Reilly, 2014

Rachel Feller, 2008

Jessica Gribble, Su 2017

Courtney Hand, 2014

Nathan Marceil, 2008

Sarah Starling, Sp 2017

Monty Carter, 2009-2011

Youri Nelson, 2010

Jaimee Pyron, F 2016

Peter Thompson, 2009-

Louis Shakleton, 2012

Sarah Johnson, 2016

2011

Julienne Beblo, 2011-2012

Matthew Reeps, 2015-2016

Jasmyn Ferbish, 2011

Kasey Palmquest, 2013

Jeremy Miller, 2011

Amanda Laraia, 2011

Undergraduate Internship Supervised

Eleanor Fallaize, 2014

Abigail Milkus, 2014

Lauren Smith, 2014

Stephanie Gray, 2014

Alexa Chrisos, 2014

Advisory Committee Member

Ph.D.

Henery Raab, ECU
Christian Commander,
UNCW, 2019

Lisa Hollensead, UNCW,
2018
Astrid Layton, Engineering,
GA Tech, 2014

Matt Lau, NAU, 2014
Lindsey Deignan, UNCW,
2017

Rebecka Brasso, UNCW,
2014

Leigh Ann Harden, UNCW,
2013

M.S.

Danielle Goldberg, 2020

Amanda Busch

Amanda Cole, 2017

Sean Hardison, 2017

Molly Johnson

(Kennesaw State

University), 2016

Nikolai Klibansky, UNCW,
2013

Mike Polito, UNCW, 2012

Amelia Sosnowski, 2015

Elizabeth Gomez (Stony
Brook University), 2015

Tiffany Lewis

Andrew Long

Wai Leong

Amber Morris

Christi Visaggi, UNCW,
2012

Lou Muzyczek

Lisa OGawa

Brad Parnell

Jessica Mallindine

Jennifer Idol

Honors Advisory Committees

Mackenzie Wantje (Psychology, 2019). *Variables Affecting Performance on the Rodent Odor Span Task*. Primary mentor: Dr. K. Bruce.

Apria Valenza (Marine Biology, 2018). *Factors that affect the growth and development of juvenile flounders in the Cape Fear River*. Primary mentor: Dr. Scharf.

Breanna Crowley (Biology, in process, 2018). Primary mentor: Dr. Kaiser & Dr. Rhodes

Courtney Lane (Biology, 2017). *Use of VL55 medium to culture antibiotic-producing bacteria from soil samples*. Primary mentor: Dr. Kaiser & Dr. Rhodes

David Billips, Honors (Biology, 2016). Primary mentor: Dr. Long

James Andrew, Honors (Marine Biology, 2015). Primary mentor: Dr. White

Peter Lawson, Honors (Biology, 2013). Primary mentor: Dr. Stapleton

Corey Rand, Honors (Mathematics, 2013). Primary mentor: Dr. Freeze

Drew Howard, Honors (Marine Biology, 2012). *Effects of beach re-nourishment on ocean surf-zone turbidity: Assessment using a predictive model*. Primary mentor: Dr. Lankford

Ahmed Metwally, Honors (Marine Biology, 2011). *Do algal toxins affect the swimming behavior of microzooplankton?* Primary mentor: Dr. Taylor

Anna Robuck, Honors (Marine Biology, 2010). *Testing natural products from the sponge Aplysilla longispina and tunicate Eudistoma hepaticum for the development of nontoxic antifouling paints*. Primary mentor: Dr. Pawlik

SERVICE & LEADERSHIP

Professional

Editorial Board

2017–present. Ecological Modelling: International Journal on Ecological Modelling and Systems Ecology.

Officer

2017–present. Secretary, North American Chapter of International Society for Ecological Modelling.

Editor

2015. Guest Editor for article, PLoS Computational Biology. (1 paper)

2013-2014. Guest Editor for Special Issue, Ecological Modelling, Volume 293. 17 papers.

Reviewer

Manuscripts: *Ecological Modelling*; *Environmental Modelling & Software*; *Oikos*; *Ecology Monographs*; *Ecology Letters*; *Ecological Indicators*; *Ecology and Evolution*; *Acta Ecologica Sinica*; *Environmental Management*; *Landscape and Urban Planning*; *Environmetrics*; *Frontiers of Earth Science*; *Resources, Conservation & Recycling*.

Proposals: NSF-GEO/OCE (F & Sp 2015, F 2016), MD SeaGrant, NSF-BIO (F 2016, Panel 2016).

Organizing Committees

2016. *Scientific Advisory Board, International Society for Ecological Modelling Global Conference 2016*. Towson University, Baltimore, MD.

2016. *Network Modeling Symposium*. International Society for Ecological Modelling Global Conference 2016, Towson University, Baltimore, MD.

2013. *Systems Ecology: A Network Perspective and Retrospective*. A workshop in honor of the 45th anniversary of Professor Bernard C. Patten at the University of Georgia (April 12-14, 2013). One of 3 co-organizers (Stuart J. Whipple, Brian D. Fath).

2008. *University of Georgia Ecological Network Analysis Conference (2008)*. Athens, GA. One of multiple co-organizers.

Judge

2014. *Best Student Presentation/Poster*. 43rd Benthic Ecology Meeting, Jacksonville, FL

2013. *Science Fair*, Wrightsville Elementary (Dec.).

2010. *Theory Section Award for best presentation*. 95st Annual Meeting, Ecological Society of America. Pittsburgh, PA.

2006. *Buell Student Award for best presentation*. 91st Annual Meeting, Ecological Society of America. Memphis, TN.

Consulting

2016. *Consultant*, College of Health and Human Services, Dean C. Hardy. Assessed the college leadership structure and made recommendations for improvements to enhance the college effectiveness and sustainability.

Community

Advisory Boards and Board of Directors

- 2018-present. *Resource Advisory Committee, Cape Fear Economic Development Council*, Wilmington, NC.
- 2010-2016. *Cape Fear Museum of Science and History*, New Hanover County, NC. Chair (2015-2016), Assistant Chair (2014-2015).
- 2013-2014. *Cape Fear Economic Development Council*, Wilmington, NC.

Invited Lectures

- 2020. *North Carolina Coastal Plain – A Biodiversity Hotspot*. North Carolina Coastal Land Trust (April 10)
- 2020. *Why do Universities do Research?* Burgaw Rotary Club (Jan.)
- 2019. *Reproducibility Crisis in Science*. Public Issues Forum, Osher Lifelong Learning Institute at UNCW (April 9).
- 2019. *Why do Universities do Research?* Wilmington Cape Fear Rotary Club (Mar. 8)
- 2019. *Why do Universities do Research?* SEA & Coffee, Osher Lifelong Learning Institute at UNCW (Feb. 28).
- 2018. *Biodiversity Hotspot? Essential Ecological Elements of the Lower Cape Fear Region*. Scene III Woman's Social Group, Wilmington, NC. (Feb. 8).
- 2016. *Ecological address and selected neighbors of the Lower Cape Fear Region*. Church of the Servant Episcopal. (April 23)
- 2015. *Ecosystem applications of network models*. SEA & Coffee, Osher Lifelong Learning Institute at UNCW. (Sept 24).
- 2015. *The rise, utility, and beauty of network ecology*. SEA & Coffee, Osher Lifelong Learning Institute at UNCW. (Feb 5).
- 2013. *Ecological address and neighbors of the Lower Cape Fear Region*. SEA & Coffee, Osher Lifelong Learning Institute at UNCW. (Sept. 30).
- 2012. *Ecological address and neighbors of the Lower Cape Fear Region*. Cape Fear River Watch, First Saturday public lecture series. (June 2).

Committee Member

- 2011-2012. *STEM Regional Roundtable*. Committee of formal and informal educators, businesses, and NPOs and NGOs.
- 2009-2010. *Environmental Sustainability Committee*. Church of the Servant Episcopal Church, Wilmington, NC. This committee is planned and executed a community meeting to learn about environmental stewardship from a faith perspective held Feb. 2010. I participated in regular meetings and co-led the search for the keynote speaker. Wilmington, NC.

Organizer/Leader

- 2009. Tour of the Wilmington Northside Waste Water Treatment Plant. (2009). Environmental Sustainability group from the Church of the Servant Episcopal Church. Wilmington, NC.

College and University

Research & Innovation Work Group (co-chair with Dr. Justine Reel). 2020. This work group was part of the Fall 2020 Planning Team that developed needs and recommendations for the University Fall opening and operations in light of the COVID-19 pandemic.

Doctoral Transition Committee (co-chair with Dr. Susan Sinclair). 2019. University committee of faculty, staff, and administrators tasked with (1) identifying the unit-level impact of our R2 status on culture, identity, and current practices/processes, and (2) assessing needs relative to completing (and maintaining) the transition to R2 status in the domains of teaching, research, and service. The committee reported its findings and recommendations to the Chancellor in April 2020.

Dean's Faculty Fellow. 2016-2017. I initiated a project to strengthen *faculty community and culture* at UNCW that honors its diversity and strengths so that we are able to effectively respond together to the changing landscape of higher education. Raised funds from the College of Arts and Sciences Dean, Center for Faculty Leadership, and Graduate School Dean to purchase lunch for small groups of faculty (3-8 individuals). The goal was to introduce faculty to each other and build relationships. Invited 109 faculty and hosted 40 at lunches, recruited 2 volunteer hosts. College of Arts & Sciences, University of North Carolina Wilmington.

UNC Faculty Assembly, Faculty advisory body to the University of North Carolina system president and Board of Governors.

2014–2018. Elected delegate from UNCW.

2015. Faculty Assembly Leadership Nomination Committee.

2016–2017. Finance Committee.

UNCW Faculty Senate

2014–present. Faculty Welfare Committee (Chair, 2017–2018)

2013–present. University Curriculum Committee (Chair 2018)

2013–2015. Faculty Senator for Dept. Biology and Marine Biology

UNCW Strategic Planning Committee (2015).

Subcommittee for attracting and retaining students, staff, and faculty.

Provost's Advisory Council (2017–2018), Provost Marilyn Sheerer, UNCW.

Commencement Speaker, College of Arts and Science, UNCW. (December 2017)

Information Technology Advisory Council, College of Arts and Sciences, UNCW (2015–2016)

Panel Discussant. *Out of Print: Film Screening & Discussion*. Writers Week 2013 (Nov. 8, 2013)

Leader. *Tour of Outdoor Classrooms and Laboratories*, Osher Life Long Learning Program (Sept. 2016). Co-led with Z. Long, A. Williard, R. Shew.

Organizing Committee. *Walking Tour of UNCW's Natural Areas*, an Osher Life Long Learning Institute event held for UNCW Chancellor Miller's Installation. One of 6 committee members and tour leaders.

Orientation Leader. (2010). Spoke with beginning freshman about college life.

University Institutional Effectiveness Committee (2009). Advisory Role. Advised with modeling the university planning process for SACHS review. Facilitated two participatory modeling meetings with university administrators.

Administrative Search Committees

Assessment Director, College of Arts and Sciences, UNCW 2017. Successfully recruited C. Saunders.

Director, Experiencing Transformative Education through Applied Learning (University's Quality Enhancement Plan). UNCW 2014. Successfully recruited J. Boersma.

Provost and Vice Chancellor for Academic Affairs, UNCW 2012. Successfully recruited Dr. D. Battles

Staff Search Committees

Director, Environmental Health and Safety. (2019).

ITSD Search Committee for Academic Research Systems Analyst. (2011). Reviewed 13 full applications, interviewed 3 candidates.

UNCW Center for Teaching Excellence and Faculty Leadership

2010–2016. Advisory Board, *Center for Teaching Excellence*

2015. Panel Discussant. *Visualizing Data* (Nov. 17)

2013. Panel Discussant. *College: What It Was, Is, and Should Be* (Nov. 19)

2013. Co-Led (with Roger Shew and Amanda Willard) CTE Workshop. *A Tour of UNCW's Outdoor Classrooms*. (March 12)

2011. Panel Discussant. *Round-table discussion on Teaching Innovation*. (Oct. 6)

2011. Hosted and assisted Matt Lau for a campus wide *R Tutorial*.

UNCW Honors College

2015, 2016–2018. Faculty Fellow. Co-developed program to increase Honor Student success and retention with Dr. G. Richardson. Once developed, Dr. Richardson and I administered the program and taught selected workshops.

2009–2013. Advisory Board, *Center for the Support of Undergraduate Research and Fellowships*.

2010. *Honor Scholars Program Cultural Dinner*. Hosted dinner and cultural experience for 7 UNCW freshman.

Department

Department of Biology and Marine Biology, UNCW

Ad-Hoc Broader Impacts Committee (2015–2016).

Liaison. Department Liaison to campus Information and Technology Services (2010–2016). Undergraduate Curriculum Committee. (2014–2015).

Chair. Ad-Hoc Laboratory Report Committee. (2013–2014). Created a common template and expectations for student laboratory reports to teach and re-enforce high quality science writing across the Biology curriculum.

Liaison. Department Liaison to Center for Teaching Excellence (2010–2013).

Long Range Planning Committee.

2013–2014. The committee conducted a self-assessment and SWOT analysis and then prepared a 5-10 year strategic plan for the department that the faculty adopted.

2016–2018. Reviewed progress on the long range plan and revised goals as needed.

Advancement and Student Relations Committee.

2012–2013. This committee evaluated the merits of starting a Departmental Facebook page and helped hire Jen Cole to initiate the page.

2016–2017. *Chair*. Committee initiated process for an integrated marketing review of the department promotional materials to be conducted in 2017–2018.

2017–2018. *Chair*. Continuing work to conduct an Integrated Marketing Assessment for the department.

Undergraduate Assessment Committee Member (2009–2013). *Coordinator* (Fall 2011–Spring 2013). Committee met approximately every other week during Fall 2009 and Spring 2010 to design and implement the assessment of the departmental learning objectives. As coordinator, I chaired the primary committee work, managed two artifact evaluation subcommittees, administered the assessment program, and analyzed and reported results to the department and college.

Organizing Committee. *Gulf of Mexico Symposium*. Public symposium was held at UNCW Spring 2012. Mike Tidwell was the keynote speaker. A discussion followed with an expert panel.

Chair's Advisory Committee. (2010-2012). Assisted the Department Chair as needed on departmental policies and procedures. Reviewed all faculty annual reports each year.

Ad hoc B.S. Marine Biology Curriculum Review Committee. (2009). This committee met ~5 times during Fall 2009. Proposed curriculum changes adopted by the Biology faculty Spring 2010.

Faculty Search Committees

Vertebrate Biologist (2014-2015). UNCW Dept. of Biology and Marine Biology.

Reviewed 75 applications. Successfully recruited Ray Danner.

Plant Biologist (2013-2014; 2 Faculty Positions). UNCW Dept. of Biology and Marine Biology. Reviewed ~200 applications. Successfully recruited D. Penneys.

Coastal and Marine Biologist (2012-2013; 4 Faculty Positions). UNCW Dept. of Biology and Marine Biology. Reviewed ~300 applications. Successfully recruited S. Brander, S. Lopez-Legentil, R. Condon, and S. Kamel.

Coastal Plant Ecologist (2008–2009). UNCW Dept. of Biology and Marine Biology.

Reviewed ~60 applications and interviewed 4 candidates for the position. I hosted one candidate reception at my home. Successfully recruited Dr. Z. Long.

Institute of Ecology, University of Georgia

Chairperson. *Faculty Symposium Committee* (2003).

Graduate Student Representative. *Curriculum Committee* (2002-2004).

Graduate Student Representative. *Faculty* (2002-2003). Institute of Ecology.

Organizing Committee Member. *Graduate Student Symposium* (2000-2002), *Chairperson* 2002.

Graduate Student Representative. *Computer Oversight Committee* (1999-2001).

Faculty Search Committees

Quantitative Ecologist (2000-2001). Institute of Ecology, University of Georgia, Athens, GA. Successfully recruited P. Rohani.

ADDITIONAL PROFESSIONAL DEVELOPMENT

Invited Research Workshop & Conference Participation

- 2017 *Use of coastal and estuarine food webs models in politics and management: The needs for an entire ecosystem approach to prevent crises.* Alfred Wegener-Institute Helholtz-Zentrum für Polar und Meeresforschung, Sylt, Germany. September 2017.
- 2016 *ECSA56: Coastal Systems in Transition: From a 'natural' to an 'anthropogenically-modified' state.* Bremen, Germany.
- 2014 *International Conference on Environmental Biology and Ecological Modelling,* Santiniketana, India
- 2014 *Workshop on Mathematical and Statistical Ecology.* Statistical and Applied Mathematical Sciences Institute. Research Triangle, NC.
- 2010 *Workshop on Complex Networks.* Statistical and Applied Mathematical Sciences Institute. Research Triangle, NC.
- 2009 *Investigative Workshop: New Soil Black Box Math Strategies.* NIMBioS, Knoxville, TN.
- 2008 *University of Georgia Ecological Network Analysis Conference,* Athens, GA.
- 2005 *Annual International Meeting, Institute of Biological Engineering.* Athens, GA.
- 2005 *University of Georgia Ecological Network Analysis Conference,* Athens, GA.
- 2004 *Ecosystem Complexity Workshop,* Fourth European Conference on Ecological Modelling, Bled, Slovenia.
- 2004 *Microbiological Networks,* NSF FIBR Workshop, Athens, GA.
- 2002 *Network Analysis Workshop,* Long Term Ecological Research Program, Sevilleta, NM.
- 2001 *Vulnerability of Water Quality in Intensively Developing Watersheds.* Warnell School of Forest Resources, University of Georgia, Athens, GA.
- 2001 *Foresight for Lanier: A Workshop.* Gainesville, GA. Co-organizers: G.M. Cowie, M.B. Beck, O.O. Osidele, A.K. Parker, S.R. Borrett.

Leadership

- 2018–present UNCW Leadership Enhancement and Administrative Development (LEAD). Eight part leadership development program at UNCW designed to assist senior administrators.
- 2017 Summer Leadership Institute, Project Kaleidoscope, MD. Intensive leadership development for STEM faculty, July 18-23. This program included a focus on diversity and inclusion, revealing implicit biases and the influence of power and privilege in education.
- 2015–2016 NextUp Leadership Development, UNCW Center for Faculty Leadership. Year-long professional development and leadership training. This directly led to a consulting project for Dean Hardy in which I assessed the leadership structure of the rapidly growing College of Health and Human Services and made

recommendations for improvements to enhance the college effectiveness and sustainability.

2012 Mentoring Camp. UNCW CTE. Focus on developing robust faculty mentoring programs for departments, colleges, and whole university.

Academic

- 2015 “Get Students to Focus on Learning Instead of Grades: Metacognition is Key” with Sandra McGuire, CTE.
- 2015 “ORS & ORI Grant Writing Webinar” CHHS (Nov 3)
- 2014 “How to get your Students Thinking”, Workshop, Dept. Biology and Marine Biology with CTE.
- 2014 “Having a Life While Excelling at Your Career” CTE/FL (Sept 11)
- 2011–2014 Center for Teaching Excellence (CTE) Book Circles, UNCW.
- 2014 “Teaching for Critical Thinking” with Stephen Brookfield. (April 9).
- 2013 “Creating and Delivering Powerful Lectures”, UNCW CTE, April 2.
- 2012 “4 Easy Steps to Preparing Proposal Submissions for Courses to be Included in a Cluster”, UNCW CTE, February 7, 2012.
- 2011 “Balancing work/life issues in a demanding environment”, UNCW CTE, April 13.
- 2011 “UNCW Learning Goals Series: Teaching and Assessing Information Literacy”, UNCW CTE, March 10.
- 2010 How to prepare ecological data sets for effective analysis and sharing. Workshop at 95th Annual Meeting, Ecological Society of America. Pittsburgh, PA. Organized by: R. Cook, V. Huthchinson, S. Hampton, and T. Beaty.
- 2007-2011 Attended 13 workshops at the UNCW Center for Teaching excellence including “Taming Large Lectures”, “Promoting an Undergraduate Research Culture”, and “Best Practices in Advising”.
- 2007 Teaching for Understanding in Science: Building Learner-Centered Classrooms. Workshop at UNCW led by D. Ebert-May.
- 2006 Innovative teaching and active learning in the biological sciences. Workshop at 91st Annual Meeting, Ecological Society of America. Memphis, TN. Organized by: D. Ebert-May, J. Batzli, and D. Luckie.
- 2006 Diagrams 2006 - Fourth International Conference on the Theory and Application of Diagrams. Stanford University.
- 2004 An overview of structural equation modeling and path analysis. Workshop at 89th Annual Meeting, Ecological Society of America. Portland, OR. Organized by: J.B. Grace and S.M. Scheiner
- 2003 Twenty-five years of ecological chaos: Do mathematical models really work after all? Workshop at 88nd Annual Meeting, Ecological Society of America. Tucson, AZ. Organized by: R.F. Costantino and W.M. Schaffer

Other

2019 UNCW Active Shooter Safety Training

2019 FEMA IS-0100

Society Memberships

International Society for Ecological Modelling

Ecological Society of America

American Association for the Advancement of Science

National Council of University Research Administrators

National Organization of Research Development Professionals